

Accompanying Local Stakeholders in Negotiation Processes Related to Water Allocation through Simulation Models and Role-Playing Games: An Experience from South Africa

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Introduction

During the last twenty years, the concept of decision-making on natural resources has been criticized and modified by various research communities within almost all disciplines. In social sciences, for instance, ecological economics (Costanza, 1989; Ramos-Martin, 2003) and neo-institutional economics (Bromley, 1982; Soderbaum, 1992) have addressed issues such as uncertainty and incomplete information that were not explicitly taken into consideration by the conventional mainstream environmental economics (Janssen and Ostrom, 2004).

In South Africa, the new national water legislation (1998) introduces a modern framework of integrated resource management in a social context still affected by severe gaps and backlogs inherited by the Apartheid regime that ended in 1994. While there is a political imperative to promote the democratisation of decision making regarding the use of water, local institutions do not yet have the capacity or the tools to take on board these responsibilities. This paper presents and discusses an innovative action-research approach aimed at facilitating negotiation and decision-making capacity on water management at a local scale. The Kat River catchment in the Eastern Cape of South Africa is the study area.

The paper is organised as follows: section 2 provides an overview of the recent developments in the South African water sector institutional and legal frameworks and illustrates the Kat river context of multi-stakeholder negotiation around water; section 3 introduces the Companion Modelling approach and describes the negotiation tools that are being developed in the Kat; some elements of discussion are provided in section 4.

Institutional, legal frameworks and multi-stakeholder negotiations around water in the Kat River catchment

The new National Water Act of South Africa (NWA, 1998) promotes integrated and decentralised water resource management in a new institutional environment. Decentralisation of water management is promoted through catchment level water management institutions such as Catchment Management Agencies (CMAs) and Water User Associations (WUAs). As a consequence, a clear need emerges for tools that can help the future decentralised water management institutions accomplish their complex tasks.

The Kat River valley (Map) is situated in the Eastern Cape province of South Africa.

The present land and water uses in the catchment are the result of a complex history of politically driven changes to land access since the time of settlement by white colonialists in the early nineteenth century. Today the main water related stakeholders in the Kat Valley are four groups of irrigators (in function of their cultivated surface, water rights and crops produced), domestic water users and the Municipality.



As part of the redress process that followed the end of Apartheid, all irrigation boards controlled by white farmers have been required under the National Water Act to transform themselves into Water User Associations (WUA) that are representative of all water users in the area.

The Kat River WUA came into being in December 2001. The constitution of the WUA includes the following objectives: to provide water for the beneficial use of members; to actively care for and manage the health of the Kat River and Kat Dam. Under ancillary functions the WUA is mandated to "provide catchment management services to or on behalf of responsible authorities".

Action research and stakeholders' involvement through the development of simulation models and role-playing games

Simulation models (SM) and role-playing games (RPG) are increasingly adopted for educational purposes as well as for dealing with negotiation issues (Barreteau, 2003; Meadows and Meadows, 1993; Farolfi et al., 2004). A SM and a RPG are being developed to contribute to the process of building the capacity of groups of stakeholders in the Kat River valley to understand and design their own negotiation process and to select decision-making criteria for their catchment.

The development of the model AWARE (Action research and Watershed Analysis for Resource and Economic sustainability) in the



Groups discussing water demand over a year during the first Companion Modelling workshop with the Kat River Water User Association (photo by B. Bonté).

Kat River catchment follows a scientific posture called Companion Modelling (ComMod). According to this approach, "Stakeholders learn collectively by creating, modifying, and observing simulations. When carrying out simulations, one acts on the decision-making process by creating or modifying representations. ComMod leads stakeholders to share representations and simulations taking into account possible decisions and actions (management rules, new infrastructures, etc.) that are under consideration within their own environment. Simulation accompanies an iterative research process that is specific to each situation. The endless following cycle field work-> modelling-> simulation-> field work again, etc. corresponds to this concept. This leads to a diversity of models and methods, each contributing to a new kind of relationship between the simulation, the research itinerary, and the decision-making process" (The ComMod Group, 2004).

In the case of the Kat River catchment, the Companion Modelling process is implemented by iteratively co-developing the model AWARE with the local WUA. Playing a role-playing game derived from the model facilitates its comprehension by stakeholders and lays the basis for further discussion and model development. The cycle that is being adopted in the Kat River is illustrated in Figure 1.

A first workshop, in which the majority of representatives of the Kat River Water User Association participated, took place in June 2005. Representatives came from a wide range of socio-economic groups that included large-scale farmers, small-scale farmers, domestic users and the local municipality. During this workshop, local stakeholders discussed and approved the ComMod process and the prototype of the AWARE model. Before presenting the model itself, working group sessions allowed the strategies and concerns of each group of stakeholders to be presented and

discussed. The photo above shows participants using wooden blocks to build histograms representing their seasonal water use. This helped them to understand the computer generated graphs as part of the model output. Moreover, these representations of water used were incorporated into the next version of the model that was used in the second workshop.



Figure 1- The Companion Modelling approach (adapted from Cirad, 2005)

A second workshop in September 2005 was aimed at discussing the modified version of the model so that it could be developed further to better represent the Kat situation.

In November 2005 a role-playing game session was run in which the stakeholders took the place of the model's agents and acted

according to their own strategies over a seven-year period. The game outcomes were calculated by the same model as previously described. Through playing this game the actors got a better understanding of its functions. This session also provided further information regarding local water users' strategies and behaviors to be introduced in a third version of the model. This new version will be presented and discussed in October 2006.

The use of repeated cycles of modelling and discussion sessions enables researchers and their partners to reach progressively more appropriate conclusions (Figure 2). It is equivalent to what some authors call the "hermeneutic spiral" (Gummesson, 1991).

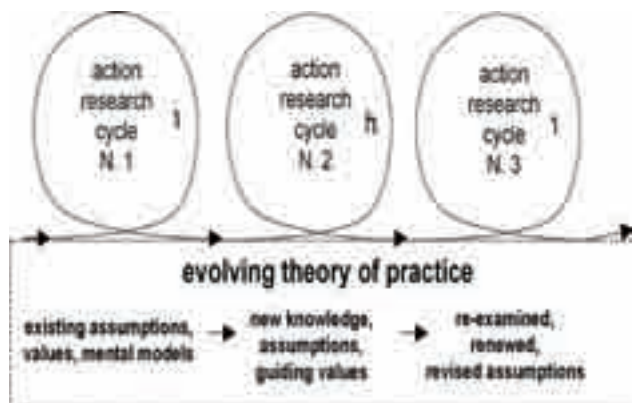


Figure 2 – The iterative nature of action research (Allen, 2000)

Discussion

This paper presented an on-going application of an innovative approach called Companion Modelling (ComMod) to facilitate multi-stakeholder negotiations around water allocation in the Kat River Catchment of South Africa. As the process is ongoing, only some elements of discussion may be proposed at this stage.

Developing the AWARE SM and playing the derived RPG in a context of a real negotiation process for the use of a limited water resource has the main advantage of providing a framework of knowledge and information common to representatives of all the stakeholders from a specific watershed. During the workshops, the focus is not only on the results and the figures that are obtained (scenarios), but also on the dynamic processes and interactions that take place among groups of stakeholders, between them and the public authority, and within the environmental and socio-economic systems. The awareness and knowledge by all water users of these multiple and interactive processes represents a clear example of local stakeholders' empowerment.

The ComMod approach follows the post-normal science posture, for which the final objective is not decision-making and production of definitive results, but rather to enrich the process of multi-stakeholder negotiation contributing to participatory decision-making. In other words, the ultimate target is not the quality of the choices, but rather the quality of the process that conducts to these choices. The process thus enables participants to become better prepared to face an uncertain negotiated future, rather than encourage prescriptive planning of future water allocations.

As for all action-research operations, it is very difficult to assess the real impact that the adoption of this approach has on local stakeholders' learning and possible change of practices. A valuation process is currently underway in the Kat valley to understand extent to which the ComMod approach is affecting individual and collective actions regarding water management and allocation.

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